WHAT IS CLAIMED IS:

1. A process for the preparation of (co)oligomers or (co)polymers comprising preparing a mixture that includes at least one monoethylenically unsaturated monomer of the general formula (M),

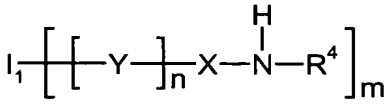
$$HR^1C = CR^2R^3 \qquad (M)$$

wherein

each of R^1, R^2, R^3 is independently selected from the group consisting of hydrogen, C_1-C_{20}-alkyl, C_1-C_{20}-cycloalkyl C_6-C_{24}-aryl, halogen, cyano, C_1-C_{20}-alkylester C_1-C_{20}-cycloalkylester, C_1-C_{20}-alkylamide, C_1-C_{20}-cycloalkylamide C_6-C_{24}-arylester or C_6-C_{24}-arylamide,

at least one oxidizing agent (A) and

at least one polymer or oligomer of the general formula (I),



(I)

wherein

Y organic residue based on ethylenically unsaturated monomers (M) corresponding to the general formula $HR^1C=CR^2R^3$ and

R^1, R^2, R^3 have the aforesaid meaning,

m is an integer of 1 to 50,

n is an integer of 1 to 300 and

I_1 represents an initiator and

R^4 represents a secondary or tertiary carbon atom and is independently selected from the group consisting of C_1-C_{18}-alkyl, C_2-C_{18}-alkenyl, C_2-C_{18}-alkynyl, C_3-C_{12}-cycloalkyl or C_3-C_{12}-heterocycloalkyl, C_6-C_{24}-aryl, which may be unsubstituted or substituted by NO_2, halogen, amino, hydroxy, cyano, carboxy, ketone, C_1-C_4-alkoxy, C_1-C_4-alkylthio or C_1-C_4-alkylamino,

X represents a secondary or tertiary carbon atom and is independently selected from the group consisting of C_1-C_{18}-alkyl, C_2-C_{18}-alkenyl, C_2-C_{18}-alkynyl, C_3-C_{12}-cycloalkyl or C_3-C_{12}-heterocycloalkyl, C_6-C_{24}-aryl, which may be unsubstituted or substituted by NO_2, halogen, amino, hydroxy, cyano, carboxy, ketone, C_1-C_4-alkoxy, C_1-C_4-alkylthio or C_1-C_4-alkylamino,

and an optional free radical initiator (B) and

(II) heating the mixture at a temperature in the range of 0°C to 220°C.

2. The process according to Claim 1, wherein the mixture further contains a solvent selected from the group consisting of water, alcohols, esters, ethers, ketones, amides, sulfoxides and hydrocarbons .

3. The process according to Claim 1, wherein the monomer (M) is selected from the group consisting of styrene, substituted styrene, conjugated dienes, acrolein, vinyl acetate, acrylonitrile, methyl acrylate, methyl methacrylate, butyl acrylate, butyl methacrylate, 2-ethylhexyl acrylate, cyclohexyl methacrylate, isobornyl methacrylate and maleic anhydride.

4. The process according to Claim 1, wherein the oxidizing agent (A) is selected from the group consisting of peracetic acid, perpropionic acid, hydrogen peroxide, hydrogen peroxide/titanium containing catalysts, potassium peroxymonosulfate ($2\ KHSO_5 \cdot KHSO_4 \cdot K_2SO_4$), silver oxide and lead (IV) oxide.

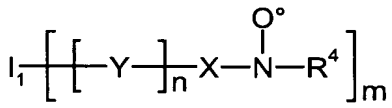
5. The process according to Claim 1, wherein the temperature in (II) is 50 to 180°C.

6. The process according to Claim 1, wherein the temperature in (II) is 70 to 150°C.

7. The process according to Claim 1, wherein the mixture is prepared at a temperature of 0 to 100°C.

8. The process according to Claim 1, wherein the mixture is prepared temperature of 0 to 50°C.

9. A process for the preparation of nitroxyl radicals of the general formula (III),



(III)

wherein

Y organic residue based on ethylenically unsaturated monomers (M) corresponding to the general formula $HR^1C{=}CR^2R^3$ and

R^1, R^2, R^3 is independently selected from the group consisting of: hydrogen, C_1-C_{20}-alkyl, C_1-C_{20}-cycloalkyl C_6-C_{24}-aryl, halogen, cyano, C_1-C_{20}alkyl ester C_1-C_{20}-cycloalkyl ester, C_1-C_{20}-

alkylamide, C_1-C_{20}-cycloalkylamide C_6-C_{24}-aryl ester or C_6-C_{24}-arylamide,

m is an integer of 1 to 50,

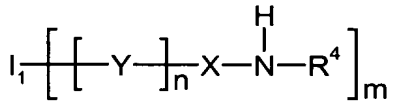
n is an integer of 1 to 300, and

I_1 represents an initiator and

R^4 represents a secondary or tertiary carbon atom and is independently selected from the group consisting of C_1-C_{18}-alkyl, C_2-C_{18}-alkenyl, C_2-C_{18}-alkynyl, C_3-C_{12}-cycloalkyl or C_3-C_{12}-heterocycloalkyl, C_6-C_{24}-aryl, which may be unsubstituted or substituted by NO_2, halogen, amino, hydroxy, cyano, carboxy, ketone, C_1-C_4-alkoxy, C_1-C_4-alkylthio or C_1-C_4-alkylamino,

X represents a secondary or tertiary carbon atom selected from the group consisting of C_1-C_{18}-alkyl, C_2-C_{18}-alkenyl, C_2-C_{18}-alkynyl, C_3-C_{12}-cycloalkyl or C_3-C_{12}-heterocycloalkyl, C_6-C_{24}-aryl, which may be unsubstituted or substituted by NO_2, halogen, amino, hydroxy, cyano, carboxy, ketone, C_1-C_4-alkoxy, C_1-C_4-alkylthio or C_1-C_4-alkylamino,

comprising forming a mixture that contains a polymer or an oligomer conforming to formula (I)



(I)

wherein

I_1 , Y, n, X, R^4 and n are as defined above , and an oxidizing agent, and isolating the compound of formula (III).